

# PATENT ABSTRACTS OF JAPAN

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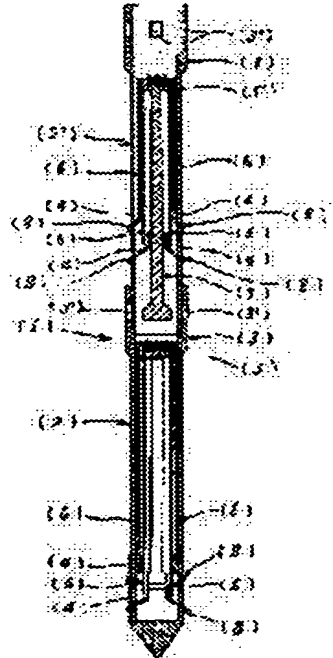
## (54) PILE FOR CIVIL ENGINEERING WORK

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To keep the stable state of a pile in the ground by fitting core bodies arranged with multiple wedge bodies formed into an acute angle shape at the tip and different in length so that the wedge bodies are made shorter as they approach the inner walls of pile bodies into the pile bodies formed into a conical or angular shape at one end and provided with multiple opening sections on the side wall.

**SOLUTION:** A pile main body 1 for civil engineering work is constituted of a leading pile body 2 formed into a conical or angular shape at the tip and opened at the other end and a joint pile body 2' formed with a coupling section with the leading pile body 2 at one end and a connection section on an opening edge section at the other end, and multiple opening sections 4 are provided on the side wall. Multiple wedge bodies 6 formed into an acute angle shape at the tip and different in length are fitted to core bodies 5, 5' fitted to the leading pile body 2 and the joint pile body 2' respectively so that the

length of the wedge bodies 6 is made shorter as they approach the inner walls of the pile bodies 2, 2'. When the pile main body 1 fitted with the core bodies 5, 5' is driven into the ground and the core body 5' is pushed, a middle drive body 7 provided in the core body 5' pushes the core body 5, and the wedge bodies 6 are protruded into the ground from the opening sections 4. The pile main body 1 can keep its stable state as if it takes root in the ground.



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**CLAIMS**

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[Claim(s)]

[Claim 1] It is a pile for civil works as a guidance pile characterized by an end being formed a cone or in the shape of a pyramid, and, as for the other end, having a connection by the shape of opening, and the interior being formed in the shape of a cavity, and being equipped with the core object which has the wedge object of two or more sheets with which a tip is formed in the shape of an acute angle in the pile with which two or more openings are prepared on a side attachment wall, and changing.

[Claim 2] It is a pile for civil works as a joint pile characterized by carrying out opening of the both ends, and for an end side changing with the attachment section, and having a connection in an other end side, and being equipped with the core object which has the wedge object of two or more sheets with which a tip is formed in the shape of an acute angle in the pile with which two or more openings are prepared, and inside \*\*\*\* of the die length of \*\*\*\* on a side attachment wall, and changing by the shape of an internal cavity.

[Claim 3] The pile for lagging construction characterized by combining the pile for civil works as a guidance pile according to claim 1, and the pile for civil works as a joint pile according to claim 2, and being formed.

[Claim 4] The pile for civil works according to claim 3 characterized by preparing two or more apertures in the connection prepared in the pile in claim 1 and the pile for civil works according to claim 2, and preparing two or more apertures also in the end side attachment section of a joint pile according to claim 2.

[Claim 5] The pile for civil works characterized by forming the wedge object guidance pocket metallic ornaments by which the bottom flank is formed in the direction of an opening edge by inclining in the pile for civil works according to claim 3 at opening.

[Claim 6] The pile for civil works characterized by forming the configuration of a pile in the shape of a cylindrical shape, and a prism configuration in the pile for civil works according to claim 3.

[Claim 7] The pile for civil works according to claim 3 characterized for the plinth section of the core object which carries out fixed wearing of a wedge object or a wedge object, and the inside \*\*\*\* by cylindrical or forming in a prismatic form.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the pile for civil works used for shore protection works, road repairing, or construction / construction farmland base construction. Especially, this is related with the pile for civil works which can be used also as a pile for a boundary indicator display again about the pile for civil works which was not in old about the pile for civil works equipped with the core object which has a wedge object inside in the pile for civil works.

[0002]

[An old technique] There are various things in the old pile for civil works. For example, that which the tip consists cone-like of with the cylindrical shape, the thing currently formed in the shape of a triangle, and a whole configuration are formed in the shape of a triangle, and that in which a tip is as \*\*, the thing which attached in the cylindrical shape-like lower part, other members, for example, disk object, the thing which only attached the bar in the timber lower part are still more various. And most is formed of concrete material or the material of these piles for civil works is based on iron material. moreover, the core object which has a wedge object inside the pile even if it makes it the pile for civil works formed not only of the pile for civil works formed by concrete material but of other quality of the materials — having — the inside of soil — deep — coming out — the wedge object of a core object — the inside of soil — eye slant — or it is stuck conversely and the pile for civil works constituted so that the operation which prevents escaping and coming out [ of the pile for civil works ] may be carried out is not found in old.

[0003]

[Problem(s) to be Solved by the Invention] The old pile for civil works had various things also in magnitude also with the configuration. And most of the quality of the material was formed with concrete material or iron material. But the popular pile for civil works is formed a cylinder drill configuration or in the shape of a cylindrical shape. When using such a pile for civil works for shore protection works, such as a river, the seashore, or a road, it was what in which uses the pile for civil works, driving it in aslant or perpendicularly. Moreover, also in the case of the civil work for construction / construction, this was the same. For this reason, even if it struck the pile for civil works to the place where soil texture is weak, and the place of a soft ground, when there is a fault of the pile itself not being stabilized, swinging, or escaping and time amount passed even in the hard place of the foundation, it was what has the fault of the pile for civil works swinging, or looming. Moreover, it was what still has instability with the old pile for civil works also in earthquake resistance. Do not swing in this way or it is not stabilized, and the pile for civil works also of construction will be dangerous with the condition that it looms, will have the danger that after a job closeout is remarkable, and is inconvenient. This invention tends to improve such a fault and un-arranging, and tends to offer the pile for civil works which can hold the condition of having been stabilized more in soil.

[0004]

[Means for Solving the Problem] In order to solve the above faults and un-arranging An end is formed a cone or in the shape of a pyramid, and it has the other end with a connection by the

shape of opening. And in the pile with which the interior is formed in the shape of a cavity, and two or more openings are prepared in the side attachment wall The pile for civil works as a guidance pile with which it is equipped with the core object which has the wedge object of two or more sheets with which a tip is formed in the shape of an acute angle Carry out opening of the both ends by the shape of an internal cavity for (calling it a guidance pile hereafter), and an end side changes with the attachment section. In the pile with which it has a connection in an other end side, and two or more openings are prepared in the side attachment wall The pile for civil works as a joint pile which it is equipped with the core object which has the wedge object of two or more sheets with which a tip is formed in the shape of an acute angle, and inside \*\*\*\* of the die length of \*\*\*\*, and changes To opening of the pile for civil works which combined (it is hereafter called a joint pile), and this united pile for civil works The pile for civil works made into the pile for civil works, the shape of a cylindrical shape, and the prism configuration where wedge object guidance pocket metallic ornaments were formed, The pile for civil works which prepared the aperture in the connection of a guidance pile and a joint pile, and prepared the aperture also in the end side of a joint pile, moreover, the pile for civil works which constituted the plinth section of a core object in cylindrical or the configuration which made it the prismatic form, prepared the notch in the plinth section, or excised the angle of the plinth section — further It is canceled by using the pile for civil works which prepared two or more notches for the both-sides wall or the single-sided wall of a wedge object. This invention tends to provide old with the completely new pile for civil works which was not seen in this way.

[0005]

[work —] for Although this invention can be used as a pile for civil works even if a guidance pile is independent usually, as well as the pile for civil works (guidance pile) with which it is equipped with the core object with which two or more wedge objects are attached in the pile In a pile, the pile for civil works (joint pile) with which it is equipped with the wedge object of two or more sheets and the core object which has inside \*\*\*\* joins together, and is formed, and in that case, it is equipped with the tip of each wedge object so that it may stop respectively at the opening pile inside edge established in the pile side attachment wall. Then, the tip of this pile for civil works is first driven in into soil. After driving in this pile for civil works to a required limit, the core object with which the interior of this pile for civil works is equipped is driven in in the direction of a tip of this pile for civil works by applying cylinder material or prism material, the ingredient, for example, the log material, of \*\*\*\*, etc. to other end opening of this pile for civil works, and striking the ingredient of that \*\*\*\* to it. The wedge object with which the opening pile inside edge at which it is fixed to this core object, and that tip is established in the pile side attachment wall is equipped will move into soil from opening at the same time the first core object moves in the direction of a tip first by doing so. The wedge object which the core object which will press the core object with which \*\*\*\* is prepared in the point pile while being prepared in the core object which moves to this and coincidence first, therefore is established in the point pile moves, consequently is prepared in the core object will project and go into soil from pile opening one by one. And the more a core object approaches a tip, the more this wedge object will be deeply stuck aslant into soil. moreover, a wedge object can be stuck into soil by being able to add a joint pile one by one, when boiling the pile for these civil works deeply among soil and devoting oneself, and it being able to be deeply alike among soil, being able to lay underground, stabbing with the pile for these civil works in soil deeply even in such a case, and taking a stop and the procedure same after an appropriate time in the place of \*\*\*\*, and it can be deeply alike among soil as a pile for civil works, and can be made to stop This invention carries out such an operation.

[0006]

[Example] Hereafter, the example of this invention is explained based on a drawing. The core object perspective view by which drawing 1 is the general drawing of this invention, and a sectional view is equipped with drawing 2 and it is equipped with drawing 3 in a guidance pile, The core object perspective view and drawing 5 with which a joint pile is equipped drawing 4 R> 4 A busy condition Fig., Drawing 6 is the whole wedge guidance pocket metallic-ornaments perspective view, and the general drawing showing the example of others [ drawing 7 ], the core

object perspective view by which it is equipped with drawing 8 in the guidance pile of other examples, and drawing 9 are core object perspective views with which it is equipped in the joint pile of other examples.

[0007] (1) is the body of the pile for civil works concerning this invention. This body for civil works of a pile (1) usually consists of a guidance pile (2) and a joint pile (2'), and junction immobilization of this guidance pile (2) and the joint pile (2') is carried out by well-known approaches, such as adhesion and attachment. However, this body for civil works of a pile (1) does not consist of a guidance pile (2) and one joint pile (2'), depending on the class of construction, on a joint pile (2'), can carry out junction immobilization of the joint pile (2') further, and can also not necessarily go. The configuration of a guidance pile (2) and a joint pile (2') can constitute this body for civil works of a pile (1) in various configurations, such as the shape of a cylindrical shape, and a prism configuration. For example, it can constitute also the shape of a triangle, and in the shape of a pentagon. This body for civil works of a pile (1) is mainly formed of metal material or concrete material. However, it is also possible to manufacture using hard synthetic-resin material depending on the class of civil work.

[0008] (2) is a guidance pile. A guidance pile (2) is constituted as follows. An end side (tip) is formed a cone or in the shape of a pyramid, and it changes, and it is formed in the shape of opening, and the connection is formed in the opening-like edge by the other end side (side linked to a joint pile) with one. Furthermore, the interior of a guidance pile (2) is shut in airtight in the fixed range by the tip side, and is formed in the other end side direction in the shape of a cavity. Opening of two or more bodies is prepared in the side attachment wall of a guidance pile (2). Although opening prepared in this side attachment wall may be prepared in the part of \*\*\*\*, in this example, it is regularly prepared in bilateral symmetry. Moreover, the aperture is prepared in the connection and a flight channel can also be further prepared in the wall of a connection.

Thus, it is equipped with the core object with which two or more tips have an acute-angle-like wedge object inside the guidance pile (2) formed, and a guidance pile (2) is constituted.

[0009] (2') is a joint pile. Junction immobilization is carried out with a guidance pile (2), and a joint pile (2') constitutes the body for civil works of a pile (1). This joint pile (2') is constituted as follows. The side which the interior is carrying out opening of the both ends by the shape of a cavity, and is joined to a guidance pile (2) an end side Change with the attachment section, and an aperture is prepared in the attachment section, and a connection is formed by an other end (2), i.e., guidance pile, side and the opposite side at an opening-like edge at one, and it grows into them. Moreover, although opening may prepare and grow into that side attachment wall and this opening may be prepared in the part of \*\*\*\*, in this example, it is regularly prepared in bilateral symmetry. Furthermore, the aperture is prepared in the connection like the attachment section by the side of an end, and a flight channel can also be prepared in the wall of this connection. Thus, it is equipped with the core object with which a tip has two or more acute-angle-like wedge objects and inside \*\*\*\* of the die length of \*\*\*\* inside the joint pile (2') formed, and a joint pile (2') is constituted.

[0010] (3) is a connection. This connection (3) is prepared in each of a guidance pile (2) and a joint pile (2'). The connection (3) is formed in the opposite one end opening-like edge outside in the guidance pile (2) at one the side by which is formed in the opening-like edge outside of the side by which junction immobilization is carried out with opposite one end (2'), i.e., a joint pile, a tip side at one, and junction immobilization is carried out with a guidance pile (2) in a joint pile (2'). The aperture is respectively prepared in this connection (3) regularly. The attachment section of a joint pile (2') is attached in this connection (3) (3), for example, the connection of a guidance pile (2), and a guidance pile (2) and a joint pile (2') function as one pile for civil works by carrying out junction immobilization. Moreover, it can be used for the connection (3) of a joint pile (2') as a longer pile for civil works by carrying out attachment junction immobilization of the attachment section of a joint pile (2') further. In addition, since attachment junction is made easy, a screw-like slot can also be established in the connection (3) inside.

[0011] (3') is an aperture. This aperture (3') is regularly prepared in a connection (3). Moreover, this aperture (3') is regularly prepared also in the attachment section side of a joint pile (2'). For example, this aperture (3') is regularly prepared in the connection (3) in other examples also by

this example again at four places. It is not necessary to be necessarily four places. Since the aperture (3') is prepared regularly, four four places and apertures (3') are regularly prepared in the connection (3) also at the attachment section side of a joint pile (2'). Thus, by preparing an aperture (3') respectively, it is convenient for carrying out attachment junction immobilization with a guidance pile (2) and a joint pile (2'). That is, by, making the attachment section of a joint pile (2') attach in a guidance pile (2) connection (3) for example, and making each aperture (3') in agreement, a guidance pile (2) and a joint pile (2') will not shift, and junction immobilization will be carried out. Also in order to carry out joint immobilization of the joint pile (2') joint pile (2') in straight line for the aperture (3') prepared in this each to to be not only what functions in this way in order to carry out junction immobilization of a guidance pile (2) and the joint pile (2') in straight line, but, it functions.

[0012] (4) is opening. This opening (4) is prepared in the side attachment wall of a guidance pile (2) and a joint pile (2'). Although this opening (4) may be prepared in \*\*\*\*, it is good to prepare in the side attachment wall of a pile regularly on relation with the wedge object prepared in a core object. In these example and other examples, it is respectively prepared in the side attachment wall regularly symmetrically with some height at a total of eight places. That is, it has some height also in the side attachment wall of a guidance pile (2), and the side attachment wall of a joint pile (2') again, and opening (4) is prepared in eight places regularly symmetrically. Although the wedge object prepared in the core object with which the interior is equipped from all these openings (4) projects, it is not necessary to make it not necessarily project from no openings (4), either. It consists of these example and other examples so that a wedge object may project from all openings (4). Moreover, other metallic ornaments can also be formed in this opening (4).

[0013] (5) And [ both ] (5') it is a core object. A part of this core object (5) and (5') differ in that configuration. It is equipped with a core object (5) in a guidance pile (2), and a joint pile (2') is equipped with a core object (5'). For this reason, on a core object (5), while a core object (5') has, it does not have \*\*\*\*. This is because the core object (5) in a guidance pile (2) does not move, therefore the wedge object of a core object (5) stops projecting into soil with the core object (5') with which it is equipped with the core object (5) with which it is equipped in a guidance pile (2) in a joint pile (2'), if not pressed. For this reason, a core object (5) and a core object (5') differ in that configuration. The wedge object with which the tip of the number of \*\* No. is formed in the shape of an acute angle is prepared in the core object (5). In these example and other examples, it has two-sheet \*\*\*\* forward and backward, has some height right and left, and eight sheets are prepared regularly symmetrically. However, the number does not necessarily need to be eight sheets. If constituted regularly symmetrically, it is possible to use six sheets or at least the ten number of \*\*\*\*. moreover — a core object (5') — everything but this wedge object — inside \*\*\*\* — a core — the inside of the body — it is perpendicularly prepared in the alignment by the die length of \*\*\*\*. Thus, it is equipped with the core object (5) constituted in a guidance pile (2), and is equipped with a core object (5') in a joint pile (5'). The core object (5) with which it was equipped respectively, and (5') do not fall the inside of a guidance pile (2) and a joint pile (2') simply. It is made according to friction and an operation of a wedge object.

[0014] (6) is a wedge object. As for this wedge object (6), the tip is formed in the shape of an acute angle. Thus, by forming, a protrusion into soil is easy and it is because the inside of soil will be stabbed more deeply. Of course, you may constitute in other configurations. In these example and other examples, every eight sheets of this wedge object (6) are respectively attached in a core object (5) and (5'). However, it is not necessary to be necessarily eight sheets. For example, six sheets or ten sheets are sufficient. It is also possible to increase or reduce a wedge object (6) according to the difficulty of a civil work. In a core object (5) and (5'), the wedge object (6) is constituted so that it may change perpendicularly at merit and \*\*. This is for making opening (4) prepared in the side attachment wall of a guidance pile (2) and a joint pile (2') suit. It is constituted so that a wedge object (6) can come from opening (4) outside easily. It is equipped with a core object (5) and (5') so that the tip of this wedge object (6) may touch an opening (4) inside edge respectively. Since the metallic ornaments which show opening (4) to this wedge object (6) can also be formed, this wedge object (6) can also be made to project outside from opening (4) more easily. Furthermore, a notch (10) can also be prepared in the both-sides

wall or the single-sided wall of this wedge object (6). By preparing a notch (10), root swelling reinforcement of a wedge object 6 can also be strengthened.

[0015] (7) is inside \*\*\*\*. Attachment immobilization of the inside [ this ] \*\*\*\* (7) is carried out in perpendicular like [ the core of the core object (5') with which it is equipped in a joint pile (2') ] the wedge object (6). Adhesion immobilization is carried out and the end of inside [ this ] \*\*\*\* (7) is going down the other end to the core object (5') perpendicularly downward. The tip of the other end is constituted by the shape of a cylindrical shape, and the prism configuration, and can be constituted in other configurations. Inside [ this ] \*\*\*\* (7) is constituted from a wedge object (6) formed in coincidence by the core object (5') by some die length at the magnitude of \*\*\*\*. By pressing for example, a core object (5'), inside [ this ] \*\*\*\* (7) moves in down [ down / of a tip ], i.e., the direction of the body for civil works of a pile (1), passes through the inside of a joint pile (2'), and presses the core object (5) of a guidance pile (2). By press of inside [ this ] \*\*\*\* (7), the core object (5) in a guidance pile (2) moves in the direction of a tip, and the wedge object (6) prepared in the core object (5') is projected outside at the same time it makes the wedge object (6) currently fixed to the core object (5) project outside from opening (4). Inside \*\*\*\* (7) acts in this way. The same operation is carried out even if it is the case where a joint pile (2') is connected.

[0016] (8) is wedge object guidance pocket metallic ornaments. It is in the condition which the lateral surface inclines in the direction of an opening edge, and these wedge object guidance pocket metallic ornaments (8) are constituted, and is carrying out opening the second page, and some stop section is prepared in front opening one end, and it is constituted. Thus, attachment immobilization of the wedge object guidance pocket metallic ornaments (8) constituted can be carried out at opening (4) prepared in each side attachment wall of a guidance pile (2) and a joint pile (2'). These wedge object guidance pocket metallic ornaments (8) have some size, and that magnitude attached has some change by the height of opening (4). That is, it is because it is equipped so that it may be contained by the wedge object guidance pocket metallic ornaments (8) by which it does not conflict with these wedge object guidance pocket metallic ornaments (8) by which the tip of the shorter one of the wedge object (6) with the same long tip of the wedge object (6) by which attachment immobilization is carried out is built in a core object (5) and (5'), but a tip with a longer wedge object (6) is built in. Thus, the wedge object guidance pocket metallic ornaments (8) formed in opening (4) can make a wedge object (6) project outside, i.e., the inside of soil, from opening (4) easily, when a core object (5) and (5') are pushed. When the tip of a wedge object (6) touches the base of metallic ornaments (8), in the usual case, these wedge object guidance pocket metallic ornaments (8) also have the function to prevent that a core object (5) and (5') fall, at the same time they carry out such work.

[0017] (9) is a notch or a cutting plane. This notch or cutting plane (9) is displayed on these example and other examples. A notch (9) is the case ( drawing 3 , drawing 4 ) where a core object (5) and (5') are constituted in the shape of a cylindrical shape, and a cutting plane (9) is prepared when a core object (5) and (5') are constituted by the prismatic form (the shape of a rectangle [ Especially ]) ( drawing 8 , drawing 9 ). By preparing this notch or cutting plane (9) in a core object (5) and (5'), the fixed space section will arise in the medial surface of a core object (5), (5'), a guidance pile (2), and a joint pile (2'). When this space section arises, it becomes it is possible to throw in tubing in the body for civil works of a pile (1), and possible to pour in cement or water glass into the body for civil works of a pile (1) through this tubing by this. By carrying out like this, this body for civil works of a pile (1) can be more firmly fixed in soil. Since this notch or cutting plane (9) makes such a function have, it is prepared in a core object (5) and (5') by it.

[0018] Thus, the pile for civil works of this invention constituted is used as follows. If it is used for a simple part, it is also possible to use a guidance pile (2). In this case, it will be stabbed with a wedge object (6) into soil a projection and aslant outside (inside of soil) at the same time a core object (5) moves in the direction of a tip by stabbing [ of a guidance pile (2) ] in soil from a tip, stopping a stab lump in the place of a need limit, and pressing a core object (5) by other members after an appropriate time. You may carry out, after attaching wedge object guidance pocket metallic ornaments (8) in opening (4) in advance. In the usual case, it cannot be managed



only with this, although this is sufficient when simple. It is necessary to drive in the pile for civil works into deeper soil. For example, when you need the object for earthquake-proof, the object for revetment, and big reinforcement, it cannot carry out durability with a guidance pile (2).

Therefore, a guidance pile (2) is first driven in into soil beforehand, and after an appropriate time, a required number of joint piles (2') are connected, and it goes. After connection to the required depth is completed and placing to the required depth is completed, a core object (5') is pressed with other components prepared for other member or this pile for civil works. A core object (5') moves in the direction of a tip of the pile for civil works, and makes a core object (5) and (5') moved one by one by this. By carrying out like this, the wedge object (6) of a core object (5) and (5') will be in a projection and the condition of having stretched the root, outside (inside of soil). The pile for civil works of this invention is used in this way.

[0019]

[Effect of the Invention] Thus, the pile for civil works is stabilized in soil, and a shake can be prevented, and it can prevent looming, and can be made to be able to fix firmly in soil, and this invention constituted can prevent the danger of construction among soil. Moreover, since it is suitable also for mass production method, this invention can be supplied cheaply economically. It has such effectiveness.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

**[Drawing 1]** General drawing

**[Drawing 2]** Sectional view

**[Drawing 3]** Perspective view

**[Drawing 4]** Perspective view

**[Drawing 5]** Busy condition Fig.

**[Drawing 6]** Perspective view

**[Drawing 7]** General drawing

**[Drawing 8]** Perspective view

**[Drawing 9]** Perspective view

**[Description of Notations]**

- (1) The body for civil works of a pile
- (2) Guidance pile
- (2') Joint pile
- (3) Connection
- (3') Aperture
- (4) Opening
- (5) Wear in a guidance pile and it is a core object.
- (5') It wears in a joint pile and is a core object.
- (6) Wedge object
- (7) Inside \*\*\*\*
- (8) Wedge object guidance pocket metallic ornaments
- (9) A notch or the cutting section
- (10) Wedge object notch

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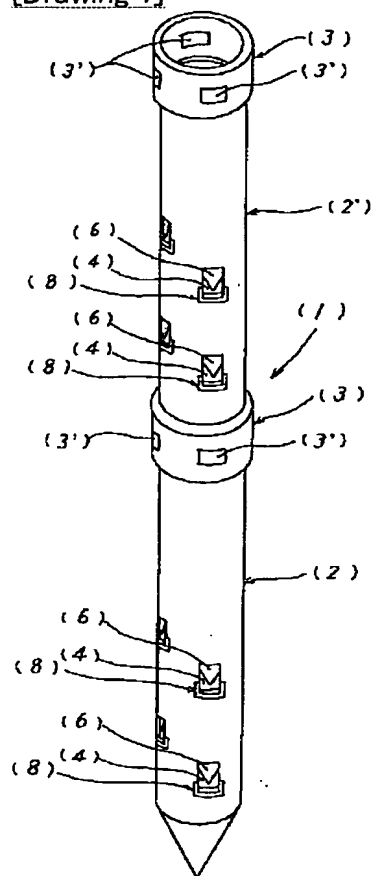
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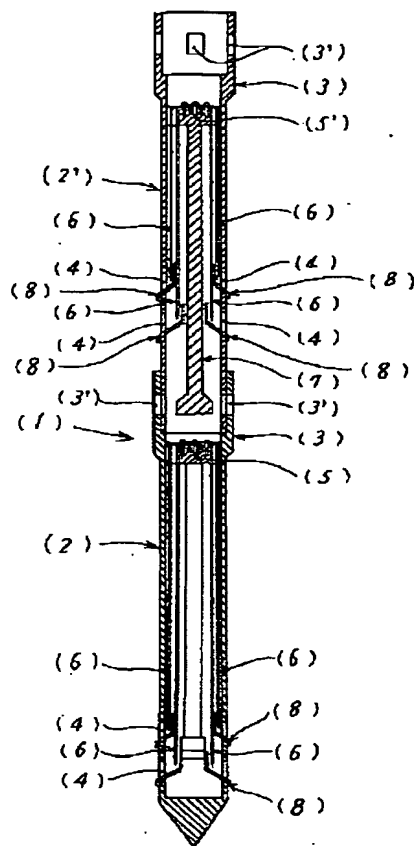
**DRAWINGS**

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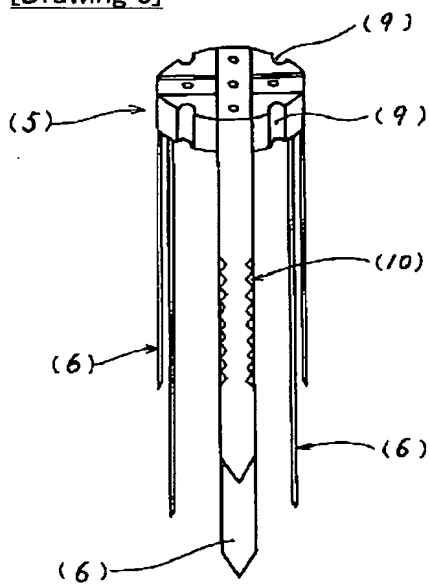
[Drawing 1]



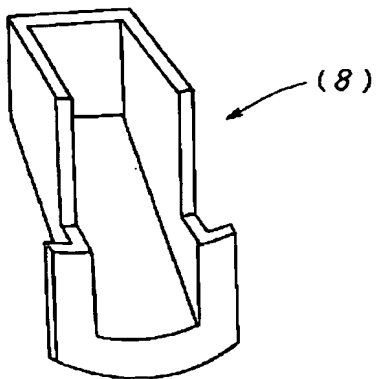
[Drawing 2]



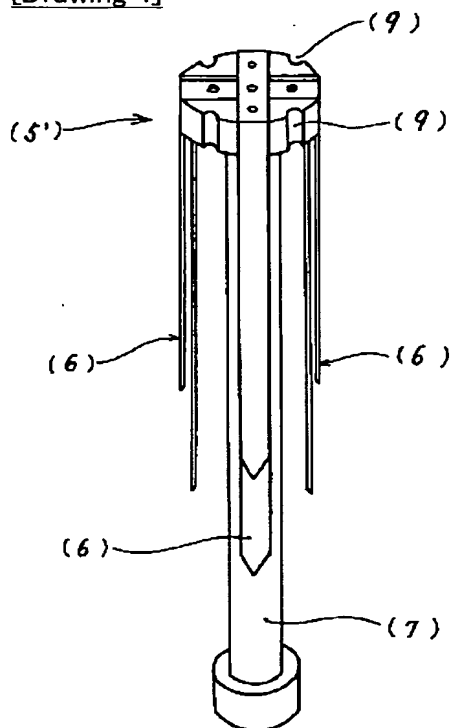
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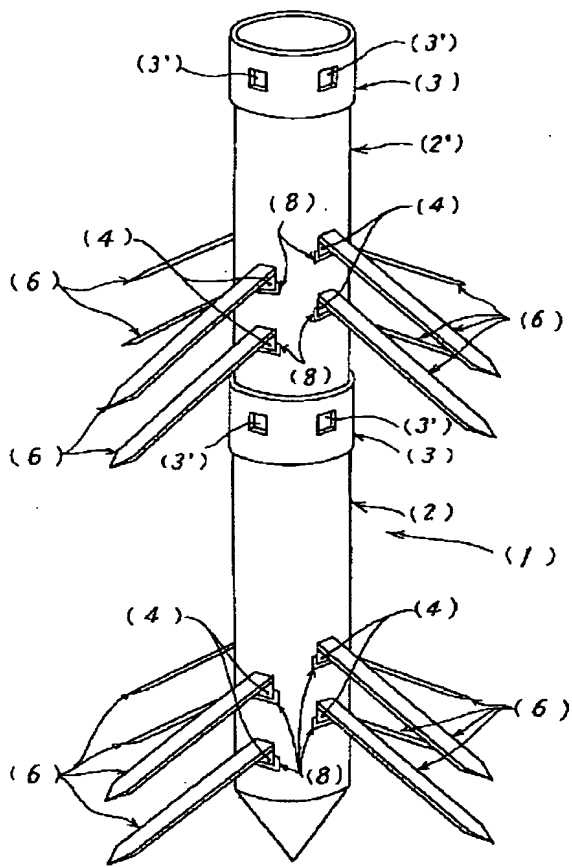
[Drawing 6]



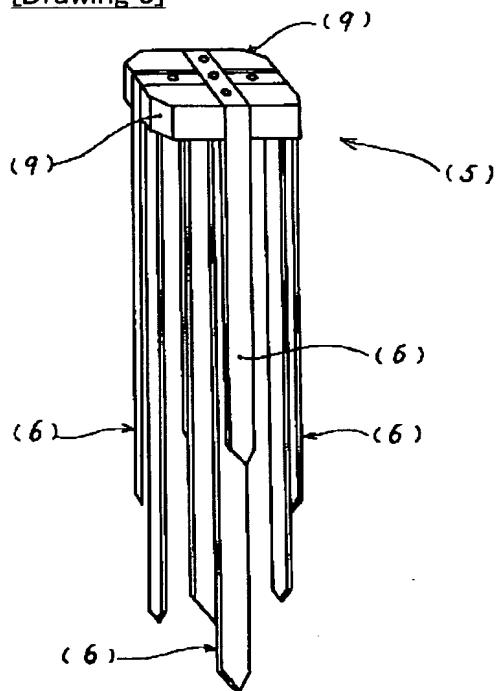
[Drawing 4]



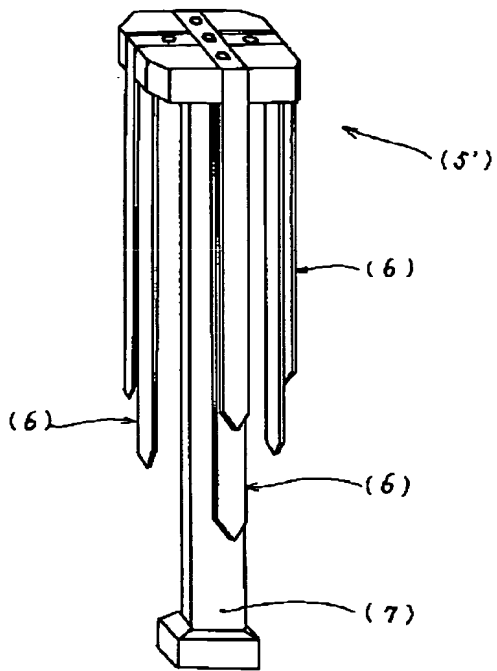
[Drawing 5]



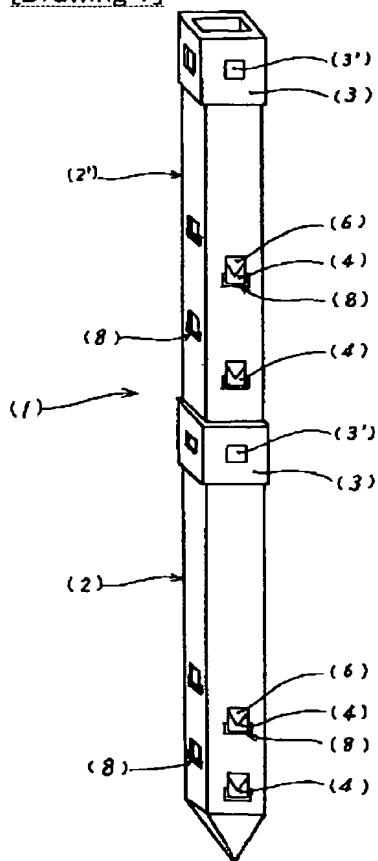
[Drawing 8]



[Drawing 9]



[Drawing 7]



[Translation done.]